REMARKS

The Applicant respectfully requests reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow.

Claims 47, 55, 65 and 69 are currently being amended.

This amendment adds, changes and/or deletes claims in this application. A detailed listing of all claims that are, or were, in the application, irrespective of whether the claim(s) remain under examination in the application, is presented, with an appropriate defined status identifier.

After amending the claims as set forth above, claims 47-78 remain pending in this application.

In Section 1 of the Office Action, the Examiner indicated that the drawings submitted on June 20, 2006 are not accepted. The Examiner restated the objection that reference characters 720 and 705 still are both used to designate the same element in Figure 8. However, in the amended figured submitted, Fig. 8 was amended as described above such that the arrow associated with reference numeral 720 more clearly points to the element associated with the reference numeral. In particular, the arrow point directly rests on the laser light source 720 including first layer 730, second layer 740, and doped junction 750. Clarification of the objection is respectfully requested.

In Section 4 of the Office Action, the Examiner rejected claims 55-64 under 35 U.S.C. § 112, ¶1 as failing to comply with the enablement requirement. The Office Action states that "[i]t is not clear how could the interference be caused along the axis." Claim 55 has been amended to recite "along which maximum interference of optical signals in the interference region occurs." Entry of the amendment and withdrawal of the rejection under 35 U.S.C. § 112, ¶1 is respectfully requested.

In Section 5 of the Office Action, the Examiner objected to claims 47-78 based on the phrase "the periphery being a single, outer periphery," indicating that this phrase is confusing and indefinite. The Applicant respectfully disagrees. Exemplary claim 44 recites "the interference region comprises the second material and is bounded on its periphery by material other than the second material, the periphery being a single, outer periphery such that only the interference region is within the periphery." The periphery is the border of the interference region and does not include any regions that may be placed within the interference region, making it a "single outer periphery. The periphery is inherently shown in all of the top-down views of FIGs. 1-5. Reconsideration and withdrawal of the objection to claims 44-78 is respectfully requested.

Claim Rejections – 35 U.S.C. § 103(a)

a. Rejection of claims 47-58 and 63-78 based on Usagawa et al.

In section 7 of the Office Action, claims 47-58 and 63-78 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Usagawa et al. (U.S. Patent No. 5,233,205).

i. Claims 47-54

Claim 47 has been amended to recite that "the maximum destructive interference being caused by the interaction between first and second light inputs." The amendment clarifies that the interference recited in the present application is not caused by any barriers placed within the interference region as taught by Usagawa, et al. Accordingly, the Applicant respectfully submits that Usagawa et al. fails to teach or suggest this element of amended claim 47.

Claim 47, further recites that "the output is positioned along a chosen line, of many lines, along which maximum destructive interference occurs when the light input at the second input is on." The Examiner argues that this limitation is "inherently met by [Usagawa, et al.] since the optical logic gate of Usagawa, et al. performs the same Boolean logic functions as the instant application and the output signal of the Boolean logic function is the direct result of the interference of the input optical logic signals, the arrangement of the

output therefore has to align in the claimed manner to produce the Boolean logic output results." The Applicant respectfully disagrees. The Examiner has cited no teaching or suggestion from any reference in support of the above statement. Further, since Usagawa, et al. is an electron based quantum wave application, and barriers are used to create a phase difference between the inputs (Usagawa, et al., col. 6, lines 21-31) the positioning of the output is not as critical. Accordingly, this element is also neither taught nor suggested by Usagawa, et al.

In the present application, light waves from the first and second lights interact within the interference region to create multiple lines of interference separated by lines of no interference (bands of both light spots and dark spots called interference fringes). The bands are projected on the wall of the interference region opposite the first and second light inputs. The position of the output can then be chosen along this opposite wall based upon calculated positions of these interferences fringes and the desired function of the optical circuit. (Application, page 6, lines 1-8) This type of interference and method of configuring the inputs and outputs within the interference region is embodied in the limitations that "the first and second optical inputs are spaced apart and the output is positioned along a chosen line, of many lines, along which maximum destructive interference occurs when the light input at the second input is on, the maximum destructive interference being caused by the interaction between first and second light inputs" and is neither taught nor suggested by Usagawa, et al.

Further, the Office Action indicates some similarities between the quantum wave circuit described by Usagawa, et al. and the optical logic circuit recited by the Applicant. The Applicant, however, disagrees with this interpretation. The optical logic circuit is based upon propagation of photons to the material and the destructive interference of wave fronts of photons propagating through the material not through a propagation of electrons and holes through a material. The Office Action also states that the quantum well structures require instant light to excite the electron and hole carriers. However, there are ways in which the electron hole carriers may be induced as opposed to light and the inducement of the electronic hole carriers by light is not described, taught, or suggested by Usagawa, et al. Further, although what is described by Usagawa, et al. is wave-like behavior of electron waves, light is not propagated through the material causing destructive interference as recited in the claims.

Accordingly, the equivalence of an electron wave and a light wave has not been established by Usagawa, et al. The Examiner argues that this is limitation taught or suggested by Usagawa, et al., stating that "destructive and constructive interferences are natural wave phenomenon for wave-like behavior." The Applicant is uncertain how this generic statement relates to either a prior art teaching or the limitation recited in the claims.

Accordingly, the Applicant respectfully requests that the rejection of claim 47 under 35 U.S.C. § 103(a) be withdrawn. Additionally, claims 48-54 depend from claim 47 and are thus patentable over Usagawa et al. for at least the same reasons as claim 47. Accordingly, the Applicant further requests that the rejection of claims 48-54 under 35 U.S.C. § 103(a) be withdrawn as well.

ii. Claims 55-58

With regard to claim 55, claim 55 has been amended to recite a similar limitation to claim 47. Accordingly, the Applicant respectfully submits that independent claim 55 is allowable for substantially the same reasons as claim 47. Accordingly, the Applicant respectfully requests that the rejection of claim 55 under 35 U.S.C. § 103(a) be withdrawn. Additionally, claims 56-58 depend from claim 55 and are thus patentable over Usagawa et al. for at least the same reasons as claim 55. Accordingly, the Applicant further requests that the rejection of claims 56-58 under 35 U.S.C. § 103(a) be withdrawn as well.

iii. Claims 65-68

With regard to claim 65, claim 65 has been amended to recite a limitation similar to the limitation added to claim 47. Accordingly, the Applicant respectfully submits that claim 65 is allowable for substantially the same reasons as claim 47. Accordingly, the Applicant respectfully requests that the rejection of claim 65 under 35 U.S.C. § 103(a) be withdrawn. Additionally, claims 66-68 depend from claim 65 and are thus patentable over Usagawa et al. for at least the same reasons as claim 65. Accordingly, the Applicant further requests that the rejection of claims 66-68 under 35 U.S.C. § 103(a) be withdrawn as well.

iv. Claims 69-78

With regard to claim 69, claim 69 has been amended to recite a similar limitation to claim 47. Accordingly, the Applicant respectfully submits that claim 69 is allowable for substantially the same reasons as claim 47. Accordingly, the Applicant respectfully requests that the rejection of claim 69 under 35 U.S.C. § 103(a) be withdrawn. Additionally, claims 70-78 depend from claim 69 and are thus patentable over Usagawa et al. for at least the same reasons as claim 69. Accordingly, the Applicant further requests that the rejection of claims 70-78 under 35 U.S.C. § 103(a) be withdrawn as well.

b. Rejection of claims 59-62 based on Usagawa et al. in view of Logan et al.

In section 11 of the Office Action, claims 59-62 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Usagawa et al. in view of Logan et al. (U.S. Patent No. 3,837,728). The Applicant respectfully submits that the claim rejections to claims 59-62 have been addressed because all of the claims 59-62 depend from independent claim 55 which is allowable. Therefore, claims 59-62 are believed to be allowable for at least the same reasons as claim 55. Accordingly, the Applicant further requests that the rejection of claims 59-62 under 35 U.S.C. § 103(a) be withdrawn as well.

The Applicant believes that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 06-1447. Should no proper payment be enclosed herewith, as by a check or credit card payment form being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 06-1447.

If any extensions of time are needed for timely acceptance of papers submitted herewith, the Applicant hereby petitions for such extension under 37 C.F.R. § 1.136 and authorizes payment of any such extensions fees to Deposit Account No. 06-1447.

Respectfully submitted,

Date 2/23/07 By _____

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